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mented by an exhaustive analytical comparison of the facts observed, with a view to their right classification and interpretation."

Papers on the topics were to be read by Hon. A. C. Butts and Hon. Geo. H. Yeaman, of the New York Bar; Judge Calvin G. Pratt, of Supreme Court, Brooklyn, N. Y.; Foster L. Backus, Esq., of Brooklyn; Prof. J. J. Reese, of University of Pennsylvania; William J. Mann, Esq.; E. P. Thwing, M.D.; Prof. Moritz Benedict, of Vienna, and others.

The Bar Association of the District of Columbia has proposed an international or interstate law congress, to be held in the city of Washington, on the 22d of May, 1888, to which shall be invited representatives of all other bar associations, judges of courts, prosecuting officers, and lawyers whose eminence in their profession entitle them to that recognition. I do not know whether this will result in a permanent organization or not. But if so, I would suggest and strongly urge that it should have a section devoted to criminal anthropology; and that anthropologic societies and congresses should do the same. By this means professional lawyers who are amateurs of anthropology, and professional anthropologists who may be amateur lawyers, would have opportunities for the accomplishment of great good in their respective sciences.

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### MICROSCOPY.<sup>1</sup>

GERLACH'S EMBRYOSCOPE.<sup>2</sup>—The embryoscope, devised by Dr. Gerlach, supplies a great and long-felt desideratum in experimental embryology. It is a mechanism for closing hermetically, a circular opening, made with a trepan, in the shell of the hen's egg; and it serves the purpose of a window, through which the living embryo may be directly observed, and its development followed from day to day.

The instrument consists of two parts: 1. A *mounting-ring* (Aufsatzring) to be firmly cemented to the egg-shell. 2. A *key-piece* with glass front, which screws into the ring and closes it air-tight.

In the Cut. *A* represents the embryoscope in perspective, and *B*, in section. The metallic mounting-ring is  $1\frac{1}{4}$  mm. thick, and has a lumen 2 cm. in diameter. The lower edge (*Ar*) is bevelled and saddle-shaped so as to fit the equatorial surface of the egg, while the upper edge is flat. From the outer surface of the ring, two square-cornered bars (*Z*) project in opposite directions. On its inner surface, a little above the lower edge, is a diaphragm (*Md*)

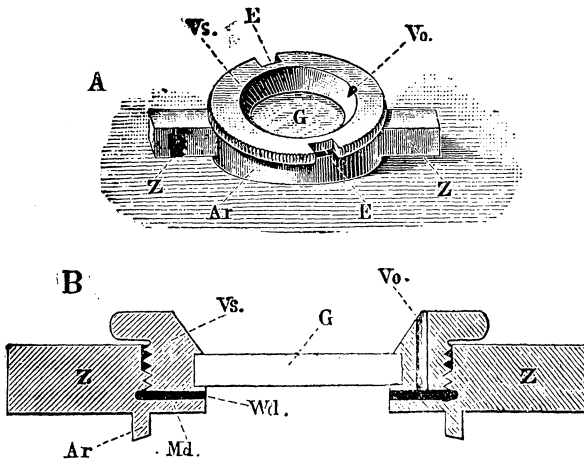
<sup>1</sup> Edited by C. O. Whitman, Milwaukee.

<sup>2</sup> *Anatom. Anzeiger*, II, Nos. 18 and 19, 1887, p. 583.

with an opening 13 mm. in diameter. Resting upon this diaphragm, and corresponding with it in size and shape, is a second diaphragm of thin wax-cloth (*Wd*), which serves as a packing-washer for the key-piece.

The key-piece of the embryoscope consists of a low, metallic cylinder, closed by a disk of glass (*G*), which represents the window that is to cover the artificial opening in the shell. The upper part of the cylinder expands peripherally to form a rim with a milled edge. This rim has two notches opposite each other, into which fit the arms of a small wrench, by the aid of which the key-piece can be tightly screwed down. There is also a short, narrow, vertical canal (*Vo*) or vent, the lower end of which must open in the middle of the key-piece ring.

The accessory apparatus required in the use of the embryoscope consists of (1) a *trepan*, (2) a *guide-ring* for the same, (3) a *metallic fork*, and (4) the *key or wrench* before mentioned.



The above-named pieces, together with a punch to cut wax-cloth diaphragms, and six embryoscopes, may be obtained from Reiniger, Gebbert, and Schall, Erlangen, for 36 marks, or from the Educational Supply Co., 6 Hamilton Place, Boston.

The trepan is a thin, metallic cylinder, 2 to 2½ cm. long, the lower end of which is toothed, while the upper part is fluted and serves as the handle. The diameter of the trepan is a trifle smaller than that of the opening of the diaphragm. The object of this is to leave a very narrow zone of shell, covered with shellac, inside the inner edge of the diaphragm.

The guide-ring for the trepan has the same construction as the

key-piece, except that it has no glass disk. It serves to steady as well as guide the trepan during the process of cutting.

The fork has two notches at the ends of its prongs, fitted to receive the two bars of the mounting-ring. When adjusted to the bars, the fork serves as a means of holding the embryoscope securely, while screwing or unscrewing the key-piece.

The wrench, the use of which has already been explained, is similar in construction to the wrench used for mathematical instruments.

The mounting-ring is fastened to the egg by means of a cement consisting of *two parts of wax* and *three parts of colophonium*. The cement is hard and brittle at the ordinary room-temperature, but becomes soft and kneadable when held in the hand for a few moments. After warming the mounting-ring over a gas or a spirit lamp, a roll of the softened cement is pressed into the space which must be completely filled between the lower face of the diaphragm and the lower edge of the ring. As soon as the ring becomes sufficiently cool, it is pressed firmly to the equatorial surface of the egg, and the excess of the still soft cement, which is thus forced outward and inward beneath the ring, should be removed before it becomes brittle, by the aid of a small, sharp-pointed blade. In order to avoid injuring the blastoderm, which might occur if the hot ring were fastened to the shell directly over it, it is best to fix the ring to the *side* rather than the top of the egg.

After the ring has been securely fixed and the superfluous cement removed, the exposed edges of the remaining cement, seen beneath the lower edge of the ring and the inner edge of the diaphragm, must be covered with a coat of an alcoholic solution of yellow shellac. This may be applied with a small brush, care being taken to cover the cement completely, and as little of the egg-shell as possible.

After the shellac has dried, a process which is completed in twelve to fourteen hours in the open air and in six hours in the incubator, the shell may be trepanned.

Antiseptic precautions are required in opening the egg. An oblong porcelain trough or glass dish is first filled with a 3% solution of carbolic acid, and in this are placed the instruments to be used in the operation: a *glass rod*, a medium-sized *brush*, small *shears*, *forceps*, the *trepan*, and the *guide-ring*. Before using, these instruments are dried with carbolized cotton, and after using returned to the dish of carbolic acid.

After washing the hands in dilute sublimate or carbolic acid, a perfectly fresh egg is painted with the three per cent. solution of carbolic acid, and then dried with carbolized cotton. The small end of the egg-shell is then cut out with the shears, and the thick white poured with the aid of the glass rod into a clean dish, leaving the yolk and the thinner white in the shell. The white is to be

used in screwing in the key-piece, and must therefore always be prepared beforehand.

After these preparations, the egg to which the mounting-ring has been cemented is disinfected in the manner above described, and placed in an egg-carrier with the ring uppermost. The inside of the ring is then brushed with carbolic acid, which is shaken out after one or two minutes and replaced by a  $\frac{1}{2}\%$  solution of common salt, which is also allowed to remain from one to two minutes, and then completely removed by means of carbolized cotton. The guide-ring is now screwed in, and the egg trepanned *from the side*, in order to avoid injuring the blastoderm. The egg is next placed with its opening upward, and the guide-ring removed. When the trepan is withdrawn, the excised piece of shell often comes with it, and sometimes the underlying shell-membrane. If this is not the case, the two pieces must be removed separately by the aid of the pincers. Care must, of course, be taken not to injure the blastoderm and the *zona pellucida*.

The thin white, which was left with the yolk in the shell, is allowed to flow over the glass rod upon the exposed blastoderm until the ring is filled, care being taken to avoid air bubbles. The wax-cloth diaphragm is next taken from the dish of carbolic acid, dried in blotting-paper, drawn through the thick white, and inserted in the ring in close contact with the metallic diaphragm; and then the key-piece, previously washed with carbolic acid and dried with carbolized cotton, is slowly screwed down. The superfluous white is thus slowly forced out through the vent (*Vo*), until the key-piece reaches the diaphragm and closes the vent. Finally, when the strength of the hand is no longer sufficient, the egg with its embryo-scope is placed in the metallic fork, and the wrench applied until with this means it is no longer possible to turn the key-piece farther.

The process of trepanning and inserting the key-piece is somewhat more complicated in the case of eggs that have already been incubated, as the egg and the fluids employed must be kept warm. A water-bath is required, consisting of a low tin box, filled with water, and provided with covered apartments for the reception of the egg, the thin white, the carbolic acid, and the salt solution, which are in this way maintained at a proper temperature. In other respects, the mode of procedure is exactly the same as given above.

The key-piece may be removed as often as desired, provided the above precautions are taken each time in inserting it. If the key-piece is unscrewed by means of the fork and wrench, it must, of course, be washed in the warm carbolic acid, and the vent cleared by the introduction of a wire.

The egg must be placed in the incubator with the embryo-scope

on one side. If it is placed upward, the respiration of the embryo is hindered. The embryoscope can be turned up at any moment, and kept upright for five minutes at a time without injury to the embryo.

With a little practice, the whole process of arming an egg with the embryoscope may be completed in from six to eight minutes.

The embryoscope is well adapted for purposes of class-demonstration, for investigating the growth of the various parts of the embryo, and the physiological processes during embryonic life, as the action of the heart; movements of the body, etc. It is indispensable to him who would study the effects of external agents upon the embryos of warm-blooded animals; and must be of great service where it is required to determine the precise stage of development before removing the embryo from the egg. It has been found useful in studying the formation of double embryos. Fene-strated eggs have been successfully incubated up to the thirteenth day, and it is probable that under favorable conditions the embryos of such eggs would reach maturity.

On the fifth day, it is still easy to bring the embryos under the window. On the sixth and seventh days, it is more difficult. At this period the change in the position of the embryo, which requires from five to ten minutes, should take place in the incubator.

After the eighth day, the embryo cannot be brought under the window. If it be necessary to determine whether such an egg or an older one still lives, we have only to leave the egg for several hours in the incubator with the window directed upwards a little, after which, by strong reflected light, one may readily see the blood circulating through the channels of the vascular area.

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## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.—Sept. 20, 1887.—Mr. G. H. Parker gave an historical sketch of investigations upon the eyes of arthropods. Grenacher's theory of the hypodermal origin of the retina, developed by involution, has been borne out by later studies. From a study of the nerve distribution, the speaker believed the three-layered eye to be evolved from that with one layer.

Mr. Meehan stated that in *Mesembryanthemum* and similar plants, the glands of which develop in inverse proportion to the roots, chemical analysis sometimes determines the presence of more nitrogen than can be obtained from the soil. It was suggested that the glands absorbed the gas from the atmosphere.

Mr. H. T. Cresson exhibited specimens of prehistoric implements collected from beds surrounding what had probably been pile dwellings on the mud flats of the Delaware, near Naaman's Creek.